SpicE

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WP3 Professional development of STEAM Special Need educators

D3.1 Joint Curriculum for STEAM in Special Education

September 2023

University of Cyprus

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Table of Contents

Executive Summary (EN) 6
Executive Summary (GR) 7
Executive Summary (BG) 8
Executive Summary (SP) 9
1. Introduction 10
2. Background for the Joint STEAM Curriculum in Special Education 11
2.1. The needs of pre-service and in-service teachers in the context of inclusive STEAM education 13
2.2. Synchronous, Asynchronous and Blended Learning Training Courses 15
3. The Methodology for Developing the Joint STEAM Curriculum in Special Education 19
3.1. Phase 1: Identification and purposeful selection of teachers' needs ... 19
3.2. Phase 2: Selection of teacher competences and alignment with teachers' needs 21
3.3. Phase 3. Internal review of the emerged Joint STEAM Curriculum in Special Education 24
4. The learning pathways of the training program 26
5. The Massive Open Online Course (MOOC) 29
5.1. The structure of the MOOC 29
5.1.1. Week 1: Introduction 30
5.1.2. Week 2: STEAM education 31
5.1.3. Week 3: Inclusive and Special education 32
5.1.4. Week 4 and 5: Inclusive STEAM education 33
6. **The blended learning course** 35
6.1. Structure of the blended learning course 36
7. The Mobility Training Programs 40
7.1. STEAM and Special Education pedagogy while working with children with mild disabilities and Bulgarian best practices 40
7.2. Curriculum adaptations for implementing Inclusive STEAM Education 42
7.3. Organization and Assessment Methodologies for Inclusive STEAM Education and Spanish Good Practices 43
7.4. Inclusive STEAM Education in General Classroom Learning Activities and Cypriot Good Practices 45
8. Future steps 47

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9. References 48

Annexes 52

Annex 1: The template provided to university partners for developing their mobility exchange program 52

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Index of Tables

Table 1: Pre- and in-service teachers merged needs as reported in D2.1 20
Table 2: Levels of priority of in-service and pre-service teachers' needs clustered by consortium members as reported in D2.1. 21
Table 3: The MOOC structure 29
Table 4: Teachers' needs and competences addressed during week 2 31
Table 5: Teachers' needs and competences addressed during week 3 32
Table 6: Teachers' needs and competences addressed during week 4 and 5 33
Table 7: Pre-service and in-service teachers' needs, and related competences addressed through the blended learning course 35
Table 8: The structure of the blended learning course 37
Table 9: Teachers' needs and competences addressed for the TUNI exchange program 41
Table 10: Teachers' needs and competences addressed for the UoM exchange program 42
Table 11: Teachers' needs and competences addressed for the UA exchange program 43
Table 12: Teachers' needs and competences addressed for the UCY exchange program 45

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Index of Figures

Figure 1: The phases and deriving outputs of the methodology for developing the Joint STEAM Curriculum in Special Education 19

Figure 2: The learning pathways of the SpicE training program 27

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Executive Summary (EN)

The aim of Deliverable 3.1 (D3.1) concerns the development of the “Joint STEAM Curriculum in Special Education” that would be used for reinforcing and supporting the professional development of educators (both in-service and prospective teachers) on how to fully exploit the benefits of STEAM frameworks and approaches in enhancing the inclusion of learners with mild disabilities in the mainstream classroom. The deliverable begins with an introductory note, followed by the theoretical foundations that the proposed curriculum builds upon, and continues with the presentation of the methodology that was followed for its design and development. The resulting outcome is the “Joint STEAM Curriculum in Special Education” that splits in three consecutive phases based on the type, format, structure, and content of the training materials that will be developed following the principles of the proposed curriculum. The three phases are as follows:

1. Phase 1: Massive Open Online Course (MOOC) delivered in an asynchronous online setting;
2. Phase 2: Blended learning program, delivered in both synchronous and asynchronous settings;
3. Phase 3: Teachers’ exchange programs, delivered in synchronous learning settings with physical presence of all participants and tutors.

In each training phase, we aim to progressively enhance teachers' understanding and skills in promoting various inclusive STEAM educator competences, as outlined in the D2.2 "STEAM Educator Competence Framework and Profiles for Special Needs" (Sakellaropoulou et al., 2023). These competences are tailored to specific areas and are presented within the diverse roles that an Inclusive STEAM educator may undertake. Different learning pathways are suggested to be followed during the enactment of the curriculum depending on participants’ background knowledge, professional expertise, and different needs. For each phase of teacher training that the curriculum will be enacted, analytical descriptions about the thematic areas and the associated modules are provided, followed by providing information about the content and emphasis of each module in terms of addressed needs and the accompanied competences that would be fostered, the duration and the hours of effort by the participants that are foreseen for its implementation.

D3.1 “Joint STEAM Curriculum in Special Education" concludes with the future steps that will be followed, given that the work undertaken in the context of this deliverable goes hand in hand with thework foreseen in D3.2 “Training Programme for STEAM in Special Education”.

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Executive Summary (GR)

Ο στόχος του Παραδοτέου 3.1 αφορά στην ανάπτυξη του «Ενοποιημένου Προγράμματος Σπουδών STEAM στην Ειδική Αγωγή», το οποίο θα χρησιμοποιηθεί για την ενίσχυση και υποστήριξη της επαγγελματικής ανάπτυξης των εκπαιδευτικών (τόσο των εν ενεργεία όσο και των προϋπηρεσιακών εκπαιδευτικών) σχετικά με τον τρόπο με τον οποίο μπορούν να αξιοποιηθούν τα οφέλη των πλαισίων και των προσεγγίσεων STEAM για την ενίσχυση της ένταξης των μαθητών/τριων με ήπιες αναπηρίες στην κανονική τάξη. Το παραδοτέο ξεκινά με ένα εισαγωγικό σημείωμα, ακολουθεί η θεωρητική θεμελίωση στην οποία στηρίζεται το προτεινόμενο πρόγραμμα σπουδών και συνεχίζει με την παρουσίαση της μεθοδολογίας που ακολουθήθηκε για τον σχεδιασμό και την ανάπτυξή του. Το παραγόμενο αποτέλεσμα αφορά στο "Ενοποιημένο Πρόγραμμα Σπουδών STEAM στην Ειδική Αγωγή", το οποίο χωρίζεται σε τρεις διαδοχικές φάσεις με βάση τον τύπο, τη μορφή, τη δομή και το περιεχόμενο του εκπαιδευτικού υλικού που θα αναπτυχθεί, ακολουθώντας τις αρχές του προτεινόμενου Προγράμματος. Οι τρεις φάσεις έχουν ως εξής:

1. Φάση 1: Μαζικό ανοικτό διαδικτυακό μάθημα (MOOC) που παρέχεται σε ασύγχρονο διαδικτυακό περιβάλλον,
2. Φάση 2: Πρόγραμμα μικτής μάθησης, που παρέχεται τόσο σε σύγχρονο όσο και σε ασύγχρονο περιβάλλον,
3. Φάση 3: Προγράμματα ανταλλαγής εκπαιδευτικών, που παραδίδονται σε σύγχρονα περιβάλλοντα μάθησης με φυσική παρουσία όλων των συμμετεχόντων και εκπαιδευτών.

Κάθε φάση της επιμόρφωσης επικεντρώνεται στη σπειροειδή ανάπτυξη της γνώσης και των δεξιοτήτων των εκπαιδευτικών για την προώθηση των ικανοτήτων και ρόλων σχετικών με την εκπαίδευση STEAM χωρίς αποκλεισμούς, όπως ορίζονται στο Παραδοτέο 2.2 "Πλαίσιο ικανοτήτων εκπαιδευτικών STEAM". Προτείνονται διαφορετικές μαθησιακές διαδρομές που θα ακολουθηθούν κατά την εφαρμογή του προγράμματος, ανάλογα με το γνωστικό υπόβαθρο των συμμετεχόντων, την επαγγελματική εμπειρία και τις διαφορετικές ανάγκες τους. Για κάθε φάση της επιμόρφωσης στο πλαίσιο της οποίας θα τεθεί σε εφαρμογή το πρόγραμμα σπουδών, παρέχονται αναλυτικές περιγραφές σχετικά με τις θεματικές περιοχές και τις σχετικές ενότητες, ενώ στη συνέχεια παρέχονται πληροφορίες για το περιεχόμενο και την έμφαση κάθε ενότητας σε σχέση με τις ανάγκες που αντιμετωπίζονται, καθώς και στις ικανότητες που θα προωθηθούν, τη διάρκεια και τον φόρτο εργασίας που προβλέπεται να αφιερώσουν οι συμμετέχοντες κατά τη συμμετοχή τους σε αυτό.

Το Παραδοτέο 3.1 ολοκληρώνεται με τα μελλοντικά βήματα που θα ακολουθηθούν, δεδομένου ότι οι εργασίες που αναλαμβάνονται στο πλαίσιο του παρόντος Παραδοτέου συμβαδίζουν με τις εργασίες που προβλέπονται στο Παραδοτέο 3.2 «Πρόγραμμα Εκπαίδευσης Σπουδών STEAM στην Ειδική Αγωγή».

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Executive Summary (BG)

Целта на Резултат 3.1 (D 3.1) касае разработването на "Съвместна учебна програма STEAM в специалното образование", която ще се използва за укрепване и подпомагане на професионалното развитие на учителите (както на вече практикуващите, така и на бъдещите учители) относно това как да се използват пълноценно предимствата на STEAM рамките и подходите за подобряване на приобщаването на учащите се с умерени затруднения в ученето в общата класна стая. Материалът започва с уводна бележка, последвана от теоретичните основи, на които се основава предложената учебна програма, и продължава с представяне на избраната методологията за нейното проектиране и разработване. Полученият резултат е "Съвместна STEAM учебна програма в специалното образование", която се разделя на три последователни етапа въз основа на вида, формата, структурата и съдържанието на учебните материали, които ще бъдат разработени, следвайки принципите на предложената учебна програма. Трите фази са, както следва:

1. Фаза 1: Масов отворен онлайн курс (MOOC), провеждан в асинхронна онлайн среда;
2. Фаза 2: Програма за смесено обучение, предоставяна както в синхронна, така и в асинхронна среда;
3. Фаза 3: Програми за обмен на преподаватели, предоставяни в синхронна учебна среда с физическо присъствие на всички участници и преподаватели.

Всяка фаза на обучението се фокусира върху спираловидното развитие на разбирането и уменията на учителите за насърчаване на различните компетенции и роли на приобщаващия STEAM педагог, както е определено в Резултат D2.2 "Рамка за компетенции на STEAM педагога" (Sakellaropoulouetal., 2023). Предлагат се различни пътища на обучение, които да се следват по време на въвеждането на учебната програма, в зависимост от предварителните знания, професионалния опит и различните потребности на участниците. За всеки етап от обучението на учителите, в който ще бъде въведена в действие учебната програма, са представени аналитични описания за тематичните области и свързаните с тях модули, последвани от предоставяне на информация за съдържанието и акцента на всеки модул по отношение на адресираните потребности и съпътстващите компетентности, които ще бъдат насърчени, продължителността и часовете усилия на участниците, които са предвидени за неговото изпълнение.

D3.1 завършва с бъдещите стъпки, които ще бъдат следвани, като се има предвид, че работата, предприета в контекста на този документ, върви ръка за ръка с работата, предвидена в D3.2.

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Executive Summary (SP)

El objetivo de la entrega 3.1 es el desarrollo del "Plan de estudios STEAM conjunto en educación especial" que se utilizaría para reforzar y apoyar el desarrollo profesional de los educadores (tanto en servicio como futuros profesores) sobre cómo explotar plenamente los beneficios de los marcos y enfoques STEAM para mejorar la inclusión de los alumnos con discapacidades leves en el aula ordinaria. El entregable comienza con una nota introductoria, seguida de los fundamentos teóricos en los que se basa el plan de estudios propuesto, y continúa con la presentación de la metodología que se siguió para su diseño y desarrollo. El resultado es el "Currículo STEAM conjunto para Educación Especial" que se divide en tres fases consecutivas basadas en el tipo, formato, estructura y contenido de los materiales formativos que se desarrollarán siguiendo los principios del currículo propuesto. Las tres fases son las siguientes

1. Fase 1: Curso en línea masivo y abierto (MOOC) impartido en un entorno en línea asíncrono;

2. Fase 2: Programa de aprendizaje combinado, impartido tanto en entornos síncronos como asíncronos;

3. Fase 3: Programas de intercambio de profesores, impartidos en entornos de aprendizaje síncrono con presencia física de todos los participantes y tutores.

Cada fase de la formación se centra en el desarrollo en espiral de la comprensión y las habilidades de los profesores para promover las diferentes competencias y funciones del educador STEAM inclusivo, tal y como se definen en el "Marco de competencias del educador STEAM" D2.2. Se sugieren diferentes itinerarios de aprendizaje a seguir durante la puesta en práctica del plan de estudios en función de los conocimientos previos, la experiencia profesional y las diferentes necesidades de los participantes. Para cada fase de la formación del profesorado en la que se pondrá en práctica el plan de estudios, se proporcionan descripciones analíticas sobre las áreas temáticas y los módulos asociados, seguidas de información sobre el contenido y el énfasis de cada módulo en términos de las necesidades abordadas y las competencias acompañadas que se fomentarían, la duración y las horas de esfuerzo de los participantes previstas para su aplicación.

D3.1 concluye con los pasos futuros que se seguirán, dado que el trabajo emprendido en el contexto de este entregable va de la mano del trabajo previsto en D3.2.

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1. Introduction

A major priority of SpicE project is to foster primary education teachers' ability to implement effective STEAM instruction for protecting students with Mild Disabilities (Special Education) from educational and social exclusion. In doing so, STEAM is used both as the means and as the purpose for enabling a much-needed shift in Special Education in Primary Education both at an in-service and pre-service level. To address this priority, Work Package 3, that concerns the professional development of STEAM special educators, builds upon the work accomplished in the context of Work Package 2 for the attainment of four major objectives pertaining to the following:

- development of a Joint STEAM Curriculum for Special Education;
- development of a STEAM Training Programme for Special Education;
- development of educational material for the training programme; and
- development of a Virtual Learning Environment (MOOC and OER library) to support the training programme.

Deliverable 3.1 (D3.1) pertains to the first objective, the development of a Joint STEAM Curriculum for Special Education. For the purposes of this deliverable, we first performed a literature review on topics related to STEAM and Inclusive education theoretical foundations and frameworks, in-service teachers' professional development and pre-service teachers 'initial training in STEAM and Inclusive Education contexts, needs of pre-service and in-service teachers in the context of inclusive STEAM education, format and structure of teacher professional courses with an emphasis on the potential of synchronous, asynchronous and blended learning training courses. The outcome of the literature review serves as the theoretical foundations that the Joint STEAM Curriculum for Special Education would be grounded on and is presented in the subsequent chapter.

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2. Background for the Joint STEAM Curriculum in Special Education

STEAM (Science, Technology, Engineering, Arts, and Mathematics) education was introduced as an innovative pedagogical approach during the “Americans for the Arts-National Policy” roundtable discussion in 2007, in recognition of the need to enhance student engagement and proficiency in the fields of Science, Technology, Engineering, Art and Mathematics (Perignat & Katz-Buonincontro, 2019). The educational framework first referred to as STEM aimed to provide students with the necessary knowledge and skills in these areas to equip them for further education and professional opportunities in STEM-related sectors (Dejarnette, 2018). The integration of Arts in STEM subjects modified the acronym to “STEAM” education that aimed to enhance students' creative thinking skills, engagement, problem-solving abilities, and improve their cognitive skills (Colucci-Gray et al., 2017; Quigley et al., 2017). STEAM has emerged as a prominent pedagogical approach in response to the demand for new skillsets among future citizens in both national and international economies and workplaces (Singh, 2021). Through the implementation of STEAM education, students have the opportunity to engage in technology-driven learning experiences that integrate open-ended work with an emphasis on the arts, with the aim of cultivating a sense of empowerment, inventiveness, and confidence among learners. This approach demonstrates significant advantages for marginalised populations, including women, minorities, and underprivileged communities, as it empowers them with the essential competencies and attitudes to effectively navigate the challenges they may encounter in their future pursuits (Tomar& Garg, 2020).

However, given that STEAM education has emerged as a recent development within the last decade, it presents significant challenges for educators (Herro et al., 2019), both pre-service and in-service, particularly in their endeavour to respond to the diverse needs of their students (Beaton et al., 2021). The implementation of STEAM in educational settings presents a number of challenges, as educators have reported encountering issues related to multidisciplinary co-operation, increased workload, and a comprehensive grasp of the principles underlying STEAM integration (Boice et al., 2021), as well as supporting students with mild disabilities. The inclusion of students with mild disabilities in mainstream classrooms has become increasingly prevalent. However, this practice carries the potential risk of marginalising

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these students due to their struggles in meeting the conventional standards of academic aptitude as defined by schools (Hickey, 2020). It is imperative for educators to prioritise the establishment of equal opportunities, active engagement of students, collaborative endeavours, all while delivering education of the highest standard (Arvelo-Rosales et al., 2021). Global policy documents and educational reforms call for 21st century skills in order to prepare students to navigate the complexities of modern societies (Kennedy & Sundberg, 2020). Educators are essential to the implementation of educational reforms, and a number of researchers have emphasised that teachers require guidance to accomplish this (Darling-Hammond et al., 2017). Hence, it is crucial that primary school educators acquire enough training and develop the necessary skills to successfully address diversity and promote the advancement of STEAM education and the implementation of inclusive educational practices.

UNESCO (2009) provides the following definition for Inclusion:

"Inclusion is thus seen as a process that enables due account to be taken of the diversity of needs of all children, youth and adults through increased participation in learning, cultural and community activities, as well as reducing exclusion from and within the sphere of education, and ultimately ending exclusion" (p. 9).

In the given context, the significance of teacher training cannot be overstated in terms of addressing the diverse needs of students and fostering inclusivity. It is primarily the responsibility of teachers to choose and apply effective strategies that cater to the requirements of their students. Consequently, there is a growing demand for educators to establish educational environments that foster engaging instructional and learning experiences for all students (Lindner & Schwab, 2020). For the successful implementation of STEAM educational practices that consider the inclusion of all students, it is crucial to prioritise the initial training of prospective teachers, as well as in-service teachers. This training should equip them with the necessary tools and strategies to effectively cater to the educational needs of all students, irrespective of their individual characteristics (Arvelo-Rosales et al., 2021).

Despite the limited body of research on the topic of STEAM education for students with mild disabilities, researchers have begun to demonstrate increased interest in incorporating strategies to address the unique requirements of these students within instructional frameworks. Ensuring

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equitable educational opportunities for students with mild disabilities necessitates the provision of comprehensive training for both pre-service and in-service teachers. This training should focus on cultivating 21st century skills and employing pedagogical strategies that are suitable for their cognitive abilities within classroom settings (Çevik et al., 2022).

2.1. The needs of pre-service and in-service teachers in the context of inclusive STEAM education

Over the past several decades, there has been an increase in interest in the acquisition of skills that are in high demand in 21st-century society, necessitating a comprehensive overhaul of the educational system that integrates technology, creative thinking, and problem-solving into primary education settings (Karakoyun & Lindberg, 2020). Teachers play a vital role in moulding students' potential to become agents of a sustainable future (Leal Filho et al., 2018).

The readiness of educators is a significant barrier encountered during the implementation of STEAM education (Moghal et al., 2020). According to Abell (2013), pre-service teachers require subject matter knowledge, pedagogical content knowledge, and competence in order to effectively address and implement STEAM education in their future classrooms. Future educators have strong ingrained attitudes and intentions regarding integrating the teaching of STEAM education in their future classroom (Kurup et al., 2019). One notable challenge faced by pre-service teachers is their low comprehension of the interconnectivity required to successfully include science, mathematics, engineering, technology, and art into pedagogical practices that address STEAM education within real-life situations. The study by Moghal et al. (2020) examined the perceptions of pre-service teachers towards the implementation of STEAM education. The findings indicated that the participants had a lack of comprehensive understanding of the components and requirements of teaching STEAM or integrating STEAM into the current curricular framework, resulting in the lack of optimism over the successful implementation of STEAM education. These aspiring teachers require targeted professional development opportunities to effectively acquire the necessary knowledge and skills in this domain, resulting in the improvement of their capacity to effectively impact students' potential for maximum achievement (Van Mieghem et al., 2020).

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Regarding in-service teachers, research on the implementation of inclusive STEAM education has identified several significant obstacles faced by teachers. These include the time-consuming and challenging nature of lesson planning, difficulties arising from the absence of appropriate instructional materials, and a lack of expertise and confidence in STEAM education (DiFrancesca et al., 2014; Lim & Oh, 2015).

Furthermore, as far as fostering inclusive teaching is concerned the recent meta-analysis by Dignath et al. (2022) pointed out that pre-service teachers' self-efficacy to teach inclusive classrooms were significantly higher than those of in-service teachers, which indicates that many novice teachers, due to their inexperience, hold rather unrealistic beliefs about their competence in relation to inclusive teaching. Given that increases in self-efficacy are likely to lead to the formation of more positive cognitive and emotional appraisals, and that can increase the likelihood that teachers engage in inclusive practices (Savolainen et al., 2020), there is a need to support teachers, especially in-service teachers, in order to enhance their belief in their own capabilities to effectively implement inclusive practices.

Teachers have a pivotal role in the achievement of educational objectives. In order to initiate the implementation of inclusive STEAM education in classrooms, it is imperative to prioritise the training of educators in inclusive STEAM practices and ideas. The acquisition of professional learning should result in the development of professional knowledge and competencies that enable educators to effectively address STEAM subjects in their future instructional practices (Berry et al., 2008), while catering for the diverse needs of their students (Beaton et al., 2021). The existing framework for inclusive STEAM education on a global scale exhibits deficiencies in terms of current practices, education goals, and policies. In this educational landscape, it is evident that both pre-service and in-service teachers may possess misunderstandings and encounter challenges when it comes to effectively implementing inclusive STEAM education. Consequently, there is a pressing need to explore and identify a suitable educational method for educating teachers in the realm of inclusive STEAM education.

To address this challenge, in the context of the SpicE project, a comprehensive analysis was presented in D2.1 "Gap Analysis" (University of Macedonia, 2023), regarding the needs of both pre-service and in-service teachers with regards to Inclusive STEAM/STEM education. An online survey was conducted using questionnaires among pre-service and in-service

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primary school teachers from the four participating countries, namely Bulgaria, Cyprus, Greece, and Spain. The findings of the study revealed the need for developing more in-depth understanding of STEAM Education, Inclusive Education, and Inclusive STEAM Education among pre-service and in-service primary school teachers. Additionally, it highlighted the considerable requirement for additional training in these areas. All the requisite needs and challenges identified in D2.1 along with those identified in the literature review conducted in the context of D2.2. were categorised and aligned with the roles of educators that had been presented in the "STEAM Educators' Competence Framework and Profile" of the STEAMonEDU project (Spyropoulou & Kameas, 2021). The outcome of this approach yielded a first indication of the needed competences' areas, as well as the specific competences and competences' statements that should be incorporated into the framework of the SpicE project (see D2.2 "STEAM Educator Competence Framework and profile(s) for Special Needs" for more details).

2.2. Synchronous, Asynchronous and Blended Learning Training Courses

According to Zagouras et al. (2022), currently, the field of education is going through a time of transition: from the traditional, face-to-face teaching model to new teaching and learning models that employ modern pedagogical approaches, make use of technological advances, and respond to contemporary social demands. Due to a number of factors, including the recent COVID -19 pandemic, there appears to be a growing preference for technology-enhanced distance learning over traditional face-to-face education, with a notable increase in its use. In addition, the *Blended Learning model* is characterised as a pedagogical approach that combines both online and face-to-face instructional methods (Graham et al., 2014).

Teacher training courses can be delivered through different methods: a) traditional face-to-face instruction, b) remote instruction using *synchronous* and/or *asynchronous* teaching and learning methods with the aid of digital technologies (online learning), or c) a combination of the aforementioned approaches/models (blended learning). While there have been several studies examining the implementation of face-to-face and online teacher professional development courses (e.g., Haug & Mork, 2021; Powell & Bodur, 2019), there is a limited amount of research available on the topic of blended learning. The

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study conducted by Zagouras et al. (2022) focused on a comprehensive in-service teacher training programme that has been implemented in Greece for over a decade (i.e., B-Level ICT Teacher Training). The authors of the study performed a comparative analysis of the traditional face-to-face training model and the blended training approach. The research findings indicated that teachers who engaged in blended learning teacher training programmes demonstrated superior performance compared to those who participated in traditional teacher training programmes. This aligns with existing research that suggests blended learning provides a slight advantage in terms of overall teacher success and withdrawal rates (Dziuban et al., 2018). In addition, the fact that the training activities in the blended training model were designed in a way that allowed a satisfying continuation and a strong link between face-to-face training sessions and synchronous distance training sessions with asynchronous activities contributed to teachers' improved performance in the blended training model. Overall, teachers viewed the blended learning model in teacher education as an interesting innovation that sparked their interest (Zagouras et al., 2022).

As part of the STEAMonEdu Erasmus+ project, a training program including a Massive Open Online Course (MOOC) and a blended course was designed and developed based on the competence framework for STEAM educators. This training program addressed to educators and managers/directors at all levels of education, which addresses their need to understand, adapt, apply, and create modern STE(A)M educational procedures and practices that enhance the effectiveness and acceptance of short- and long-term educational processes. The STEAMonEdu MOOC, running for six weeks with an added introductory week, concluded in August 2021. 1,100 registered and 800 starting the course while, 229 participants achieved evaluations above 75%, highlighting its effectiveness. More than 100 participants wished to continue with the blended learning course. Feedback from participants showed strong appreciation for gaining new skills, knowledge, and access to resources (Spyropoulou et al., 2022).

In the study conducted by Boice et al. (2021), the authors described the GoSTEAM@Tech teacher training programme, which consisted of a 5-week summer professional development course. This programme was further supported by ongoing financial, material, and pedagogical help provided throughout the academic year. The establishment of this comprehensive support system was made possible by a joint endeavour including educational

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institutions, a university, and community-based groups. The inception of the professional development course was undertaken jointly by educators and innovators, who started their involvement by successfully completing a 10-hour online course on Project-Based Inquiry Learning. The curriculum included introductory literature and promoted discourse around Problem-Based Inquiry Learning and effective practices in STEAM educational environments. One of the primary aims of this course was to provide participants with a shared vocabulary and pedagogical approaches as they gained expertise across their own disciplinary domains. The researchers employed authentic scenarios to expand disciplinary boundaries and facilitate the creation of innovative knowledge. The researchers support that the efficacy of STEAM professional development can potentially be augmented through the incorporation of collaborative planning sessions involving educators from diverse disciplines, the adoption of a shared pedagogical framework such as Problem-Based Inquiry Learning, and the provision of practical hands-on experiences that enable teachers to actively participate in STEAM learning.

The objective of Wang and Wang's study (2021) was to conduct a comparative analysis between synchronous and asynchronous learning within the realm of online science teacher preparation. A total of 145 pre-service science teachers were divided into four distinct groups, each assigned to a specific mode of contact. Group 1 engaged in face-to-face interaction, Group 2 participated in synchronous engagement through online meetings, Group 3 experienced asynchronous interaction through online forums, and Group 4 engaged in independent work without any kind of connection. The findings indicated that the two groups that engaged in synchronous engagement (Group 1 and Group 2) had superior performance compared to the group that engaged in asynchronous interaction (Group 3) and the group that had no interaction (Group 4) in terms of social presence, cognitive presence, and science instruction. The presence of synchronicity had a positive correlation with the pre-service teachers' engagement with their peers, which resulted in improved interaction with the educational material. Interaction and collaboration are crucial for adult learners (Peterson et al., 2018; Vrasidas & Zembylas, 2004) because they promote social aspects of learning through engagement in learning communities. Holmes et al. (2010) investigated teachers' perceptions of the structural efficacy of an online professional development experience, revealing that teachers valued multiple forms of interaction with colleagues and learning communities. Teachers asserted the

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importance of interaction, feedback, and synchronous discussions, as well as the need for teacher, social, and cognitive presence to promote learning. According to Scott and Scott (2010), social aspects function as “glue” (p. 181) in professional development communities, as interaction and collaboration promote engagement for all learners. These results align with previous research indicating that synchronous learning is more beneficial than asynchronous in fostering learners' social presence and engagement (Peterson et al., 2018).

Overall, the efficacy and significance of professional development for teachers is closely linked to their degree of involvement in the process, which is characterised by active engagement in teaching, modelling, supporting, and assessing student learning (Desimone, 2009). Furthermore, it is important for stakeholders to consider the incorporation of technology, pedagogy, and content when implementing teacher professional development. Additionally, it is crucial to recognise that teachers are professional adults with unique learning needs (Powell&Bodur, 2019). This alignment of constructs is crucial in addressing the needs of adult learners and promoting the attainment of learning objectives that facilitate effective teaching and learning.

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3. The Methodology for Developing the Joint STEAM Curriculum in Special Education

The Joint STEAM Curriculum in Special Education aims at reinforcing and supporting the professional development of educators (both in-service and prospective teachers) on how to fully exploit the potential of the benefits of STEAM frameworks and approaches in enhancing the inclusion of learners with mild disabilities in the mainstream classroom. The development of the Joint STEAM Curriculum in Special Education, which is built heavily on the grounds of the work developed in the context of WP2, namely D2.1"Gap Analysis" (University of Macedonia, 2023), D2.2 "STEAM Educator Competence Framework and profile(s) for Special Needs" (Sakellaropoulou et al., 2023), and D2.3 "Education Framework for STEAM in Special Education" (Agaliotis & Kartasidou, 2023), was carried out in three phases(see Figure 1) described in the subsequent sections.

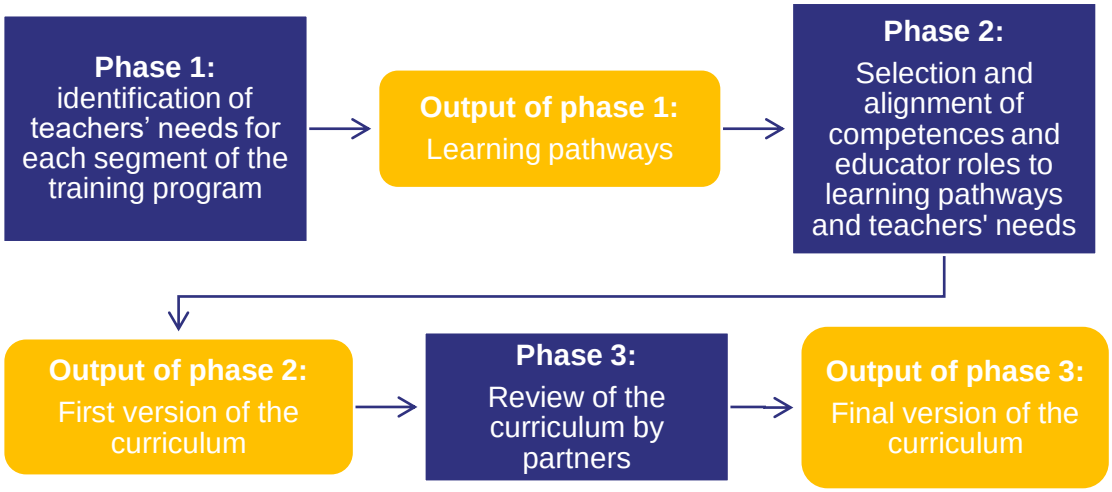

Figure 1: The phases and deriving outputs of the methodology for developing the Joint STEAM Curriculum in Special Education

3.1. Phase 1: Identification and purposeful selection of teachers' needs

The starting point of any curriculum development should be the acknowledgement of individuals' background regarding their existing knowledge, understandings, and needs of a topic under study, and subsequently addressing these in the context of the curriculum activities that will be developed. For developing the training program of the SpicE project,

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both pre- and in-service teachers' needs about STEAM education, Inclusive Education, and STEAM for Inclusive/Special Education were extracted from D2.1 "Gap Analysis" (University of Macedonia, 2023). Specifically, teachers were asked to express the status regarding their experiences and needs about the aforementioned topics in the questionnaire that was developed and administered to them in the context of D2.1. A list of these needs as extracted from this preceding work is provided below (see Table 1).

Table 1: Pre- and in-service teachers merged needs as reported in D2.1

Teachers' Needs
• **PRACTICAL SOLUTIONS FOR INCLUSION**. To know practical solutions for the educational inclusion of students with mild disabilities. • **SPECIFIC METHODOLOGY**. Training in teaching methodologies for pupils with mild disabilities. On this point, in the survey, the active teaching staff in the different countries acknowledged that they lacked sufficient knowledge of teaching methodology for pupils with mild disabilities. • **STEAM IN DAILY SCHOOL PRACTICE**. To learn about ideas for incorporating STEAM education into everyday school practice. • **THE POTENTIAL OF STEAM IN INCLUSION**. Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities. • **ADAPT THE SCHOOL CURRICULUM**. To know the ways of adapting the general school curriculum to the needs of pupils with mild disabilities. • **STEAM INTEGRATED CLASSES**. To learn about methods of organizing integrated STEAM classes. • **THE SCHOOL PROGRESS OF PUPILS.** Learning procedures to determine the school progress of all pupils. • **SPECIALITY STEAM FIELDS.** Training in teaching methodologies for each of the STEAM fields. • **INTEGRATING LEARNING OBJECTIVES**. Integration of multiple learning objectives from different content areas. • **THEORETICAL TRAINING IN STEAM**. To know the theoretical background of STEAM education. • **ASSESSMENT OF STUDENTS WITH MILD DISABILITIES**. To know methods of educational assessment of students with mild disabilities.

Given that there were commonalities among the needs expressed by pre- and in-service teachers, we proceeded with identifying the ones that were common among pre- and in-service teachers for developing the MOOC training program. The MOOC training program concerns the first phase of the training that aims at helping teachers to develop foundational understandings with regard to STEAM education, Inclusive and Special education and Inclusive STEAM education (see chapter 5 for more details).For the second phase of the training program, which is the Blended Learning Course (see chapter 6 for more details)we considered the discrete needs of in-service and pre-service teachers, along with their classification along levels of priority (high priority, priority, low priority) that was performed by the SpicE consortium members (see Table 2) for tailoring the courses with respect the two different

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groups of teachers. For the Mobility Program which is the third phase of the SpicE training program (see chapter 7 for more information), the needs that could be addressed based on the expertise of the hosting organizations and the country-specific practices relevant to Inclusive STEAM education that could be explored were selected. These methodological steps resulted to the generation of the learning pathways of the SpicE training program. More information about the learning pathways is provided in the next chapter.

Table 2: Levels of priority of in-service and pre-service teachers' needs clustered by consortium members as reported in D2.1.

In-service teachers		
High priority	**Priority**	**Less priority**
Practical solutions for inclusion	Adapt the school curriculum	Specialty in STEAM fields
STEAM in daily school practice	STEAM integrated classes	Integrating learning objectives
Specific methodology	Theoretical training in STEAM	
The potential of STEAM in Inclusion		
The school progress of pupils		
Assessment of students with mild disabilities		
Pre-service teachers		
High priority	**Priority**	**Less priority**
Practical solutions for inclusion	The potential of STEAM in inclusion	STEAM in daily school practice
Specific methodology	The school progress of pupils	Adapt the school curriculum
Theoretical training in STEAM		STEAM integrated classes
		Specialty in STEAM fields
		Assessment of students with mild disabilities
		Integrating learning objectives

3.2. Phase 2: Selection of teachers' competences and alignment with teachers' needs

After the identification of teachers' needs with respect to STEAM education, Inclusive/Special Education, and STEAM for Inclusive/Special Education we reviewed the "STEAM Educator Competence Framework and Profiles for Special Needs" reported in D2.2 (Sakellaropoulou et al., 2023) with the express purpose of selecting, matching, and aligning teachers' competences

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with teachers' needs and the deriving learning pathways of the training program. This was a step of pivotal importance, given that the development of teachers' competences that are foreseen to be fostered during the implementation of the teacher training program would enrich their professional expertise on how to use STEAM education as a vehicle for enhancing the inclusion of students with mild disabilities in the mainstream classroom. Additionally, through the development of these competences, it is foreseen that teachers will develop in unison the following roles as reported in D2.2 (Sakellaropoulou et al., 2023):

1. Role 1: Educator as an Inclusive STEAM teacher- trainer- tutor, which includes all the required educators' competences during the implementation of an Inclusive STEAM educational procedure;
2. Role 2: Educator as an Inclusive STEAM Education designer and creator, which includes all the required educators' competences related to designing and creating Inclusive STEAM educational opportunities;
3. Role 3: Educator as an Inclusive STEAM Education orchestrator, which includes all the required educators' competences related to coordinating and managing Inclusive STEAM procedures, resources, and classrooms' members;
4. Role 4: Educator as a community member, which includes all the required educators' competences related to interacting and engaging with different Inclusive/ STEAM/ Inclusive STEAM communities and applying policies; and
5. Role 5: Educator as a growing Inclusive STEAM professional, which includes all the required educators' competences related to their continuous professional development and (self) assessment along with the transferable and digital skills needed during Inclusive STEAM activities.

Specifically, for Phase 1 that the MOOC will be implemented in an asynchronous learning setting, we chose to cluster the competences that relate to foundational understandings and skills that are needed for the development of "Educator as an Inclusive STEAM teacher- trainer- tutor" (Role 1). For Phase 2 that refers to the Blended Learning program and will be delivered through synchronous and asynchronous settings, we chose to entail competences that would help participants strengthening Role 1, and competences that will scaffold them in developing Role 2 ("Educator as an Inclusive STEAM Education designer and creator"), Role 3 (Educator as an Inclusive STEAM Education orchestrator), and Role 4 ("Educator as a community member). As mentioned in Phase 1, two different learning pathways have been emerged concerning the blended learning course, according to teachers' readiness (one for in-service and one for pre-service teachers) and hence, the competences were clustered accordingly.

Lastly, for Phase 3 that the teacher mobility training will take place, each consortium university partner was invited to come up with a proposal of the

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teacher competences that can be fostered in the context of the training program that will run at their universities. The themes that have been suggested a priori in the Description of Work of SpicE project proposal according to each partner university expertise were as follows:

- UoM-Teachers will acquire knowledge relating to using UDL for STEAM in Special Education, instructional design, and Greek best practices.
- TUNI-Teachers will acquire knowledge relating to STEAM and Special Education pedagogy while working with children with learning disabilities and Bulgarian best practices.
- UA-Teachers will acquire knowledge relating to assessment and optimization of in school STEAM in Special Education practices and Spanish best practices.
- UCY-Teachers will acquire knowledge relating to curriculum design and evaluation with respect to inquiry-based learning, STEAM and Special Education and Cypriot best practices.

Additionally, consortium university partners were asked to make sure that Roles 1,2, 4 and Role 5 ("Educator as a growing Inclusive STEAM professional") should be addressed in the context of their teacher training proposals.

The communication for accomplishing this task was made via Basecamp communication platform through the following message:

Partners' anticipated contribution to the development of the Mobility training program

According to the DoW, each partner has been assigned the responsibility to develop and carry out a specialized course (four in total) during the mobility training program as follows (see p. 111-112 of the proposal):

- UoM-Teachers will acquire knowledge relating to using UDL for STEAM in Special Education, instructional design, and Greek best practices.
- TUNI-Teachers will acquire knowledge relating to STEAM and Special Education pedagogy while working with children with learning disabilities and Bulgarian best practices.
- UA-Teachers will acquire knowledge relating to assessment and optimization of in school STEAM in Special Education practices and Spanish best practices.
- UCY-Teachers will acquire knowledge relating to curriculum design and evaluation with respect to inquiry-based learning, STEAM and Special Education and Cypriot best practices.

For the purposes of D3.1 (T3.1), partners (UoM, TUNI, UA, UCY) are kindly requested to contribute to the development of the joint curriculum with respect to the mobility program through following the next steps:

1. Review the list of needs presented in D2.1 "Gap Analysis"
2. Select the needs that are associated with the above-mentioned course topic that has been assigned to you. You may also choose

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additional needs that can be addressed in the context of your specialized course and are aligned to your own expertise, academic background and country-specific good practices.

3. Choose the competences from the STEAM Education Competence Framework and Profile(s) for Special Needs (see D2.2 in Basecamp) that are associated with each of selected needs in Step 2. When selecting the competences, make sure that you have already performed a thorough review of the curriculum developed for the MOOC and Blended Learning Courses (see draft version in Basecamp) in order to choose competences that have not already been addressed elsewhere. In case you select competences that have already been incorporated in the MOOC/blended learning program, it is important to ensure that these competences will be addressed in more depth (e.g., if the learning objective was focused on adapting specific content, you can choose to focus on designing/evaluating content).
4. For the competences that you selected for each of the three days of training, provide a description of the format of the course, along with evaluation tools that you will utilize to collect feedback from participants and monitor their learning.
5. Use the template provided in the Appendix [provided in the Annex 1 of this deliverable as well] when following the above-mentioned steps. Please note that we added some suggestions at the end of the Appendix that you can integrate into your proposal.
6. Submit your contribution for review to UCY by **September 8th, 2023**.
7. UCY will review your contributions and provide feedback by **September 15th, 2023**.
8. Each partner will present his/her proposal during the Alicante meeting (**September 21-22, 2023**) and receive feedback from the whole consortium.

After receiving and reviewing each partner university proposal for the teacher training mobility program, we compiled it with the rest of the previous two phasesof training proposals, and the first draft of the Joint STEAM Curriculum in Special Education was ready for internal review.

3.3. Phase 3. Internal review of the emerged Joint STEAM Curriculum in Special Education

Once the first draft of the Joint STEAM Curriculum in Special Education was finalized, we contacted all consortium partners via Basecamp and asked them to review the proposed curriculum, make comments/suggestions, and respond to the following questions:

- Are the selected competences/learning objectives relevant to the needs selected?

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- Is the curriculum aligned to the educational policies of your country?
- Is the number of competences/learning objectives distributed appropriately (time and content-wise)?
- Are the competences appropriate for asynchronous (for the MOOC) and synchronous learning contexts (for the blended learning)?

Partners' comments and suggestions were taken into account during the first round of revising and adapting the curriculum. When needed, online meetings with specific partners were arranged for clarifications and resolving any pending issues. The revised version of the curriculum was set out for a second round of review during the consortium project meeting in Alicante (21-22 of September 2023). The partners were asked to go through the revised curriculum and check if they agree with the modifications made based on the comments they provided, and to verify whether the suggested curriculum was in line to their institutional and/or national policies and frameworks. The latter task, which was accomplished through a google form (can be accessed here) created for the purposes of collecting this type of information, would serve as a valuable insight when designing the training program for the purposes of T3.2(to be presented in D3.2) at a later stage.

In the sections that follow, we present the final version of the Joint STEAM Curriculum for Special Education. The presentation begins with the learning pathways of the training program, followed by analytic descriptions of the MOOC, the blended learning program, and the exchange mobility program.

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4. The learning pathways of the training program

The teacher training program of the SpicE project consists of three sequential training phases delivered in different settings:

1. Phase 1: Massive Open Online Course (MOOC) delivered in an asynchronous online setting;
2. Phase 2: Blended learning program, delivered in both synchronous and asynchronous settings;
3. Phase 3: Teachers' exchange programs, delivered in synchronous learning settings with physical presence of all participants and tutors.

Each type of training focuses on a spiral development of teachers' understandings and skills for promoting the different Inclusive STEAM educator roles as defined in the D2.2 "STEAM Educator Competence Framework and profile(s) for Special Needs" (Sakellaropoulou et al., 2023). In the Figure below, the roles that are fostered within each phase of the training are presented. The roles that will be promoted in more depth during each program are in bold letters.

The learning pathways that a learner can follow during this professional development program are depicted in Figure 2. As mentioned in the Methodology chapter, the learning pathways were generated based on the affordances that each type of training program would offer to the participants, teachers' needs as expressed in the D2.1 "Gap Analysis" (University of Macedonia, 2023), and the relevant literature (see chapter 2 for more details).

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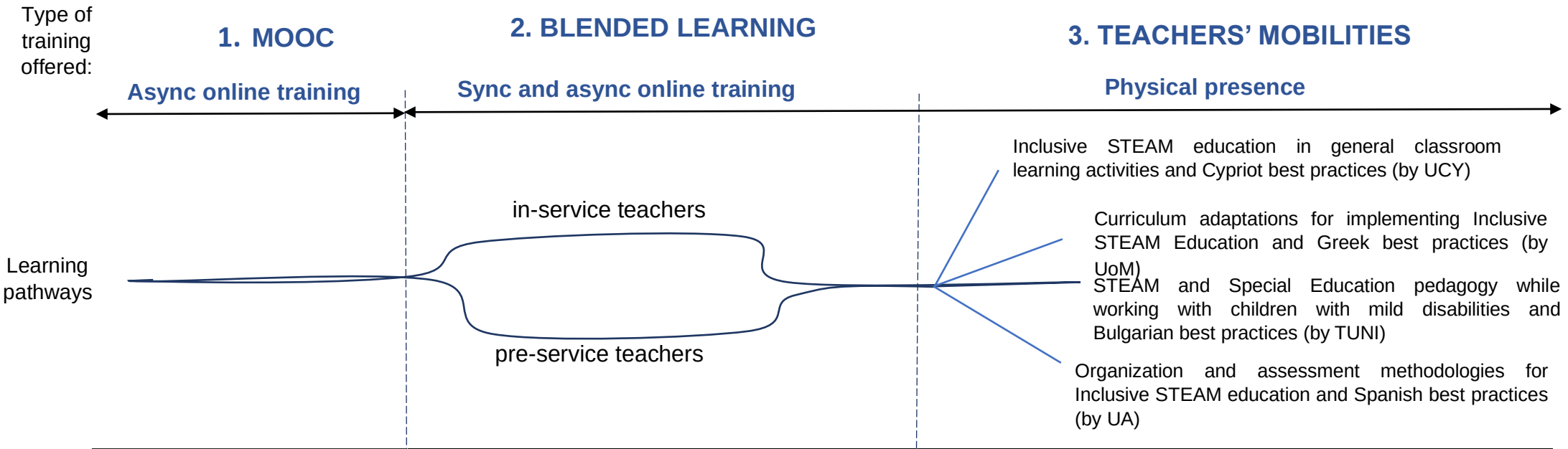
Figure 2: The learning pathways of the SpicE training program



Roles the training focuses on[1]:			
	1) Educator as inclusive STEAM teacher- trainer-tutor 2) Educator as an Inclusive STEAM Education designer & creator 4) Educator as a community member	**1) Educator as inclusive STEAM teacher-trainer-tutor** **2) Educator as an Inclusive STEAM Education designer & creator** **3) Inclusive STEAM Education orchestrator** **4) Educator as a community member** 5) Educator as a growing Inclusive STEAM professional	**1) Educator as inclusive STEAM teacher- trainer-tutor** **2) Educator as an Inclusive STEAM Education designer & creator** 3) Inclusive STEAM Education orchestrator **4) Educator as a community member** **5) Educator as a growing Inclusive STEAM professional**

[1]Roles in bold will be promoted in more depth

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Firstly, the MOOC will focus on scaffolding teachers in developing foundational understanding and skills for becoming Inclusive STEAM educators (see Chapter 5 for more details). The course is primarily addressed to pre- and in-service primary school teachers but it will be open for participation to all individuals who are interested in implementing or learning about Inclusive STEAM education. The MOOC emphasizes on the role "Educator as inclusive STEAM teacher- trainer-tutor" and incorporates the development of competences relevant to the roles "Educator as an Inclusive STEAM Education designer and creator" and "Educator as a community member".

For primary school teachers who are interested in continuing their professional development and getting more in-depth via participating in the blended learning program, there are two learning pathways available, based on whether they are in-service or pre-service teachers. These two proposed learning pathways emerged from the D2.1 "Gap Analysis" (University of Macedonia, 2023) and the relevant literature which revealed that pre-service and in-service teachers demonstrate and express different needs for training. The blended learning course concerns all Inclusive STEAM educator roles, with an emphasis on following roles: "Educator as Inclusive STEAM teacher-trainer-tutor", "Educator as an Inclusive STEAM Education designer and creator", "Inclusive STEAM Education orchestrator" and "Educator as a community member". More information on the blended learning program is provided in Chapter 6.

Some learners will be selected based on certain criteria to continue their learning pathway by participating in the teachers' mobility programs that differentiate based on the country-specific practices for Inclusive STEAM education that each program will be designed upon. The mobility training programs concern all Inclusive STEAM educator roles, with an emphasis on following roles: "Educator as inclusive STEAM teacher- trainer-tutor", "Educator as an Inclusive STEAM Education designer & creator", "Educator as a community member" and "Educator as a growing Inclusive STEAM professional". The competences that each exchange program addresses, as well as the structure of each program are presented in Chapter 7.

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5. The Massive Open Online Course (MOOC)

The MOOC titled “STEAM education for all learners: Incorporating STEAM and Inclusive education practices in everyday teaching” supports the teachers’ professional development to build foundational understandings, strategies, and competences for becoming Inclusive STEAM educators through self-regulated learning and community building activities. Specifically, the MOOC focuses on three thematic areas for which specific modules will be developed to achieve relevant competences. The thematic areas are as follows:

1. STEAM education,
2. Inclusive and Special Education, and
3. Inclusive STEAM education.

The competences chosen to guide the development of the MOOC concern mostly the educator role “Educator as inclusive STEAM teacher- trainer-tutor”. Competences relevant to the “Educator as an Inclusive STEAM Education designer and creator” and “Educator as a community member” roles are addressed as well.

The main target group of the training program are pre- and in-service primary school teachers. Nevertheless, the participation to the MOOC is open to all individuals who have an interest in the aforementioned areas, such as educators of all educational levels and subject areas (e.g., Science, Technology, Arts), special/inclusive education educators, school managers/directors, undergraduate students in their last years of studies, postgraduate students from non-formal educational institutions, educational policy makers etc. The participants should have a background in education, either through acquired teaching experience or by being enrolled or holding a degree in Educational Sciences or a relevant field.

5.1. The structure of the MOOC

As shown in the Table below, the MOOC spans five weeks. Each week concerns a thematic area and comprises of two to three modules addressing four to six competences presented in the next subsections. Each week requires an allocation of six to eight contact hours, apart from the first week that requires approximately four to five hours of effort (part-time).

Table 3: The MOOC structure

Week	Thematic area	Titles of the modules	Approx. hours of effort by the participants
1	Introduction	M1.1. Structure of the MOOC and of the training program	4-5 hours
2	STEAM education	M2.1. The STE(A)M educational approach	6-8 hours

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3	Inclusive and Special education	M3.1. Inclusive and Special Education approaches	6-8 hours
4	Inclusive STEAM education (part A)	M4.1. Introducing Inclusive and Special education strategies in STEAM activities/projects M4.2. The influence of STEAM education in Inclusive and Special Education	6-8 hours
5	Inclusive STEAM education (part B)	M5.1 Educational practices for identifying and monitoring students' needs in STEAM activities/projects M5.2. EU educational policies	6-8 hours

All training content will be accessible online in various digital forms (e.g., presentations, videos, documents). All modules include self-running presentations and forum activities for the participants to exchange experiences, ideas, good practices, etc. It is noted that all participants can easily access the MOOC with a smartphone, computer or tablet connected to the internet and equipped with the standard peripherals.

The course will include pre and post-test surveys to evaluate participants' knowledge, skills, and motivation. These surveys will serve as baseline assessments for monitoring participants' progress and for collecting valuable feedback to improve the course. In addition, a short quiz mostly for self-reflection purposes with multiple choice, true/false and/or matching type questions concludes each week of the MOOC.

In the next sections, the structure of the modules per week is presented, along with the relevant competences and teachers' needs it addresses.

5.1.1. Week 1: Introduction

During the first week, participants will be introduced to the overall course and the platform. Specifically, the participants will explore and familiarize themselves with the eLearning platform (e.g., tools, structure) and the format of the training program (e.g., tutors, assignments, educational approach). In addition, they will be informed about the SpicE project and the objectives of the training program for enhancing their motivation in becoming competent Inclusive STEAM educators. Finally, the participants will introduce themselves to the overall community to initiate the building of a constructive dialogue and exchange of good practices within the community.

The learning objectives of the introductory module are as follows:

- Become familiar with the learning environment (modules, duration, assignments/assessment/badges system).
- Interact with other learners in the e-learning community and become familiar with its tools and features.

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- Become motivated to include Inclusive STEAM practices in their class/school.
- Participate and collaborate in local, national, and international educational communities, including schools and educators (Competence 4.1.1)

Week 1 comprises of the following three modules:

M1.1. Structure of the MOOC and the training program. In this module, the background and rationale of the MOOC will be presented, as well as the overall learning objectives, requirements, and structure of the MOOC. In addition, the learners will familiarize themselves with the platform and the ways they can interact with peers, and the MOOC tutors.

M1.2. The SpicE project. In this module, participants will be introduced to the SpicE project and its approach, and the importance of Inclusive STEAM education.

M1.3. Building a community of Inclusive STEAM educators. With the use of the forum, the learners will introduce themselves to the rest of the participants. The participants will be able to exchange experiences and good practices, mention their expectations of the training program etc.

5.1.2. Week 2: STEAM education

During the second week of the MOOC, teachers' needs related to the development of understanding and strategies relevant to STEAM education will be addressed, by focusing on the development of four relevant competences, as shown in Table 4. The overall goal of Week 2 is to develop a foundational theoretical background of STEAM education (relevant frameworks, teaching practices for developing students' STEAM skills, exemplary cases of STEAM education activities, etc.).

Table 4: Teachers' needs and competences addressed during week 2

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
To know the theoretical background of STEAM education. Training in teaching methodologies for each of the STEAM fields.	1.1.2. Demonstrate and apply knowledge of the STEAM education approach
	2.3.1. Facilitate all learners' STEAM competences
	1.5.1. Assess and analyze individual learners' activity/project performance in Inclusive STEAM classrooms
	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators

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Week 2 comprises of the following three modules:

M2.1. The STE(A)M educational approach (corresponding to competences 1.1.2 and 4.1.1.). This module provides an overview of the STEAM approach, based on relevant literature (why do STEAM, what is the difference between STEAM and STEM, the different STEAM approaches, what is the role of the educator and of the student during a STEAM activity/project).

M2.2. Developing students' STEAM competences (corresponding to competences 2.3.1. and 4.1.1.). This module focuses on presenting educational strategies and tools for developing students' STEAM competences (what competences should a STEAM activity/project address, how to select and use suitable educational content, what educational strategies can an educator integrate in a STEAM lesson, what software, apps and tools can enhance STEAM learning and teaching).

M2.3. Assessment in STEAM activities/projects (corresponding to competences 1.5.1. and 4.1.1). This module focuses on familiarizing participants in formative and summative assessment methods to identify students' progress in STEAM activities/projects.

5.1.3. Week 3: Inclusive and Special education

During the third week of the MOOC, teachers' needs related to the development of understanding and strategies of Inclusive education will be addressed, by focusing on the development of five relevant competences as shown in Table 5.

Table 5: Teachers' needs and competences addressed during week 3

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
To know practical solutions for the educational inclusion of students with mild disabilities.	1.1.1. Demonstrate and apply knowledge of Inclusive and Special Education
To know methods of educational assessment of students with mild disabilities.	2.2.1. Identify and select appropriate resources and (Assistive Technology) tools for Inclusive STEAM Education
	2.3.2. Facilitate all learners' Inclusive competences
Training in teaching methodologies for students with mild disabilities.	1.5.1. Assess and analyze individual learners' activity/project performance in Inclusive STEAM classrooms

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	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators

The three modules that are clustered in Week 3 are as follows:

M3.1. Inclusive and Special Education Approaches (corresponding to competences 1.1.1. and 4.1.1.). This module focuses on presenting key principles of Inclusive and Special Education, the differences between Inclusive and Special education, as well as relevant educational approaches.

M3.2. Practical solutions and strategies for Inclusive and Special Education (corresponding to competences 2.2.1, 2.3.2 and 4.1.1.). This module focuses on presenting a variety of educational strategies (e.g., UDL) for addressing learners' individual needs, as well as Assistive Technology solutions and practices on how to incorporate relevant tools.

M3.3. Assessment for Inclusive Education (corresponding to competences 1.5.1 and 4.1.1.). This module focuses on presenting formative and summative assessment methods to identify all learners' needs and progress.

5.1.4. Week 4 and 5: Inclusive STEAM education

During the third and fourth week of the MOOC, learners will develop understanding and educational strategies relevant to Inclusive STEAM education, based on related competences as shown in Table 6.

Table 6: Teachers' needs and competences addressed during week 4 and 5

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
To know practical solutions for the educational inclusion of students with mild disabilities. To know methods of educational assessment of students with mild disabilities. Training in teaching methodologies for students with mild disabilities.	1.1.3. Identify and examine the impact of STEAM Education in Inclusive Educational Environments
	1.2.1. Assess, analyze and monitor learners' needs in Inclusive STEAM context
	1.2.2. Develop learners' profiles for Inclusive STEAM Education
	1.3.2. Apply inclusive STEAM teaching and learning techniques in Inclusive STEAM classrooms
	4.2.1. Implement policies that promote STEAM Education and Inclusion

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	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators

Week 4 is divided into two modules:

M4.1. Introducing Inclusive and Special education strategies in STEAM activities/projects (corresponding to competences 1.1.3. and 4.1.1). This module showcases strategies (e.g., UDL, DI, ILP) on how inclusive approaches can augment the learning impact and enhance skills development during a STEAM activity/project.

M4.2. The influence of STEAM education in Inclusive and Special Education (corresponding to competences 1.3.2. and 4.1.1). This module focuses on how STEAM education approaches and practices can facilitate the development of all learners' needed knowledge and skills.

Week 5 is divided into two modules:

M5.1. Educational practices for identifying and monitoring students' needs in STEAM activities/projects (corresponding to competences 1.2.1, 1.2.2. and 4.1.1). In this module, teachers will be confronted with practical solutions for monitoring the needs, as well as how to combine knowledge from learners' needs assessment and identification, screening of learners' (possible) signs of disabilities and pedagogical STEAM learners' assessment for creating learners' profiles for Inclusive STEAM Education.

M5.2. EU educational policies (corresponding to competences 4.2.1. and 4.1.1). EU education policies and procedures for Inclusion and STEAM education (e.g., European Pillar of Social Rights) will be presented and discussed in relevance to the role of an Inclusive STEAM educator.

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6. The blended learning course

The blended learning course titled “Becoming an Inclusive STEAM educator: educational practices for pre- and in-service teachers” builds on the foundational knowledge educators developed through their participation in the MOOC and aims to extend the participants’ development of more in-depth understanding, strategies, and skills relevant to Inclusive STEAM education, while considering the diverse needs of pre-service and in-service teachers (as indicated by D2.1 “Gap Analysis” (University of Macedonia, 2023) and relevant literature). The competences chosen to guide the development of the blended learning course concern all Inclusive STEAM educator roles, with an emphasis on following roles: “Educator as Inclusive STEAM teacher- trainer-tutor”, “Educator as an Inclusive STEAM Education designer and creator”, “Inclusive STEAM Education orchestrator” and “Educator as a community member”.

In the Table below, the diverse needs of in-service and pre-service teachers in respect to the competences addressed through the course are presented.

Table 7: Pre-service and in-service teachers’ needs, and related competences addressed through the blended learning course

Needs expressed by pre-service teachers (as derived from D2.1. Gap Analysis)	Competences to be addressed in the blended course (as derived from D2.2 STEAM Educator Competence Framework)
To know the theoretical background of STEAM education. Training in teaching methodologies for pupils with mild disabilities. To know practical solutions for the educational inclusion of students with mild disabilities. Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities	1.1.1. Demonstrate and apply knowledge of Inclusive and Special Education
	1.1.2. Demonstrate and apply knowledge of the STEAM education approach
	1.1.3. Identify and examine the impact of STEAM Education in Inclusive Educational Environments
	2.1.3. Design and adapt Inclusive STEAM educational activities and projects
	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators
	4.1.2. Engage with industry professionals and businesses
	5.3.1. Select and use(self)reflective practices and tools for Inclusive STEAM Education

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Needs expressed by in-service teachers (as derived from D2.1. Gap Analysis)	Competences to be addressed in the blended course (as derived from D2.2 STEAM Educator Competence Framework)
To know practical solutions for the educational inclusion of students with mild disabilities. Training in teaching methodologies for pupils with mild disabilities. To learn about ideas for incorporating STEAM education into everyday school practice. To learn about methods of organizing integrated STEAM classes Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities.	1.1.1. Demonstrate and apply knowledge of Inclusive and Special Education
	1.1.2. Demonstrate and apply knowledge of the STEAM education approach
	1.6.1. Ensure accessibility and inclusion in Inclusive STEAM educational procedure
	2.1.3. Design and adapt Inclusive STEAM educational activities and projects
	3.1.1. Apply spatial and physical organization methods in inclusive STEAM Classrooms
	4.1.2. Engage with industry professionals and businesses
	5.3.1. Select and use(self)reflective practices and tools for Inclusive STEAM Education

The blended learning course concerns pre-service and in-service primary school teachers who successfully completed the MOOC and expressed interest in participating in the next phase of the training program. If the number of participants who express interest and meet the aforementioned standards is beyond the number of participants that can be accepted for participation, additional selection criteria will be considered, such as participants' performance in the MOOC, active engagement in the community building activities, and professional background with the ultimate goal of creating a diverse-interdisciplinary group of Inclusive STEAM educators.

6.1. Structure of the blended learning course

As shown in the Table below, the blended learning course spans five weeks and it includes modules for pre-service and in-service teachers. Apart from the Introduction module, which refers to both pre- and in-service teachers, the rest of the modules focus on either pre-service or in-service teachers' needs. Nevertheless, some of the modules are open for optional participation for all educators.

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It is noted that the structure of the blended learning program is flexible, and it is possible that it will be readjusted after the completion of the MOOC and the received feedback by both participants and consortium members, based on possible emerging needs and requests of the participants.

Table 8: The structure of the blended learning course

Week	Module title	Participants	Approx. hours of effort by the participants
1	B1. Introduction	Pre-service and in-service teachers	2-3 hours
2	BP2.Theoretical underpinnings of Inclusive and Special education	Pre-service teachers	3 hours
	BI2.Theoretical underpinnings of Inclusive and STEAM education	In-service teachers	3 hours
3	BP3.Theoretical underpinnings of STEAM education	Pre-service teachers	3 hours
	BI3.Accessibility and inclusion in STEAM education	In-service teachers	3 hours
4	BP4.The added value of STEAM Education in Inclusive Educational Environments	Pre-service teachers	3 hours
	BI4. Designing inclusive STEAM education activities	In-service teachers	3 hours
5	BP5. Adapting inclusive STEAM education activities	Pre-service teachers	3 hours
	BI5. Organization methods in inclusive STEAM Classrooms	In-service teachers	3 hours

The blended course will be delivered on an eLearning platform. Some material and activities will be delivered digitally in various forms (e.g., presentations, videos, online documents, activities, etc.) during online asynchronous sessions, and others will be delivered through synchronous online tutoring sessions with real-time engagement and interaction of the participants, mainly through collaborative and interactive activities. Self-reflection journals and/or short assignments relevant to the content of the respective module will conclude each week.

It is noted that all participants can easily access the course with a smartphone, computer or tablet connected to the internet and equipped with the standard peripherals.

A brief description of each module is provided below:

B1. Introduction (corresponds to competence 4.1.1 and 4.1.2). This module refers to both pre- and in-service teachers. The participants will be introduced to the overall course and the platform. Specifically, the participants

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will explore and familiarize themselves with the eLearning platform (e.g., tools, structure), the format of the training program (e.g., tutors, assignments, educational approach, options for non-compulsory participation in different modules) and interact with the tutors and the rest of the participants to exchange views about Inclusive STEAM education, share experiences and expectations for the training program.

BP2. Theoretical underpinnings of Inclusive and Special education (corresponds to competences 1.1.1, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M3.1 - M3.3 (Week 3, Inclusive and Special education) and it focuses on describing key characteristics of instructional means for inclusive and special education, as well as when and how relevant educational strategies can be utilized during teaching and learning. Pre-service teachers (and in-service teachers who wish to participate) will use different strategies in case-based scenarios to implement relevant strategies and instructional means.

BI2. Theoretical underpinnings of Inclusive and STEAM education (corresponds to competences 1.1.1, 1.1.2, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M2.1 - M2.3 (Week 2, STEAM education) and M3.1 - M3.3 (Week 3, Inclusive and Special education). During this module, in-service teachers will make use of instructional means for Special Education (e.g., ILP), apply DI strategies in STEAM case-based scenarios and explore when and why inclusive education practices can be employed in STEAM education activities/projects.

BP3. Theoretical underpinnings of STEAM education (corresponds to competences 1.1.2, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M2.1 - M2.3 (Week 2, STEAM education) and it focuses on presenting existing STEAM frameworks and strategies on how and when each framework can be utilized during teaching and learning via case-based scenarios. This module refers to pre-service teachers, as well as in-service teachers that wish to develop a more in-depth understanding of STEAM education.

BI3. Accessibility and Inclusion in STEAM education (corresponds to competences 1.6.1, 4.1.1, 4.1.2 and 5.3.1). This module builds mostly on the MOOC's modules M3.1, M3.2 and M5.4. In-service teachers will be involved in brainstorming, discussion and reflection activities for inclusion and diversity issues within the classroom to be able to reassure access of all learners and to address prejudice and stereotypes. This is an optional module for pre-service teachers.

BP4.The added value of STEAM Education in Inclusive Educational Environments corresponds to competences 1.1.3, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M4.1 and M4.2 (Week 4, Inclusive STEAM education). It refers to pre-service teachers and focuses on presenting the added value of the STEAM approach in the creation of educational scenarios whose aims could not be achieved through traditional

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teaching methods and to explore the main prerequisites for its successful application.

BI4. Designing inclusive STEAM education activities (corresponds to competences 2.1.3, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M4.1 – M5.1 (Week 4 and 5, Inclusive STEAM education). During this module, in-service teachers will design Inclusive STEAM activities and adapt existing activities on the grounds of Inclusive STEAM education practices.

BP5. Adapting inclusive STEAM education activities (corresponds to competences 2.1.3, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M4.1 – M5.1 (Week 4 and 5, Inclusive STEAM education). During this module, pre-service teachers will adapt existing Inclusive STEAM activities to specific instructional environments on the grounds of Inclusive STEAM education practices.

BI5. Organization methods in inclusive STEAM Classrooms (corresponds to competences 3.1.1, 4.1.1, 4.1.2 and 5.3.1). This module builds on the MOOC's modules M3.2, M3.3 and M5.1. focuses on presenting practices on how to prepare, arrange and organize the classroom based on learners' needs for Inclusive STEAM activities/projects. This module concerns in-service teachers, and it is a non-mandatory module for pre-service teachers.

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7. The Mobility Training Programs

The third phase of the SpicE training program concerns the four mobility programs which will be carried out in Cyprus (University of Cyprus as the hosting organization), Bulgaria (TUNI as the hosting organization), Spain (University of Alicante as the hosting organization) and Greece (University of Macedonia as the hosting organization) respectively. The mobility training programs aim at extending the competences that educators developed through their participation in the MOOC and the blended learning courses, while at the same time gives priority on the teachers' development of more in-depth understanding, strategies and skills through exploiting the expertise of the hosting organizations and country-specific good practices. The competences chosen to guide the design of the mobility programs concern all Inclusive STEAM educator roles, with an emphasis on following roles: "Educator as Inclusive STEAM teacher- trainer-tutor", "Educator as an Inclusive STEAM Education designer and creator", "Educator as a community member "and "Educator as a growing Inclusive STEAM professional".

The duration of each program will be five days (two travelling days and three days of training) and 48 educators will be chosen to participate, 12 from each country (Cyprus, Greece, Bulgaria and Spain). These participants will have successfully completed the MOOC and the Blended Learning courses and will have expressed interest in continuing their participation in exchange program(s). If the number of participants who express interest and meet the aforementioned standards is beyond the number of participants that can be accepted for participation, additional selection criteria will be considered, such as performance in the previous training programs, active engagement in the community building activities and professional background with the ultimate goal of creating a diverse-interdisciplinary group of Inclusive STEAM educators.

The four mobility programs are presented in the next sub-sections.

7.1. STEAM and Special Education pedagogy while working with children with mild disabilities and Bulgarian best practices

This program was designed by TUNI, and it will be carried out in Bulgaria. The overarching goals pertain to teachers' acquiring knowledge relating to STEAM and Special Education pedagogy while working with children with learning disabilities, to develop Inclusive STEAM education activities/projects and learn more about relevant Bulgarian best practices that can facilitate their own teaching practice. Below, teachers' needs that will be addressed in this program for each of the three days, as well as educators' competences that will be enhanced are presented in Table 9.

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Table 9: Teachers' needs and competences addressed for the TUNI exchange program

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
Day 1	
Practical solutions for the Educational Inclusion of students with Mild Disabilities Ideas for incorporating STEAM Education in the daily school practice	1.3.1. Integrate learners' prior knowledge and skills in Inclusive STEAM Educational procedure
	1.3.2. Apply Inclusive STEAM teaching and learning techniques in Inclusive STEAM classrooms
Day 2	
Ways for adapting the general school curriculum to the needs of students with mild disabilities	1.6.1. Ensure accessibility and inclusion in Inclusive STEAM educational procedure
Day 3	
Using STEAM Education as context for including students with Mild Disabilities in the learning activities of the general classroom	1.6.2. Ensure all learners' active engagement in Inclusive STEAM activities/ projects
	3.1.1. Apply spatial and physical organization methods in inclusive STEAM Classrooms
	3.1.3 Apply time management and learning organization methods for Inclusive STEAM activities and projects

During the first day of the training, the participants' expectations, priorities and needs in relation to the implementation of STEAM for children/students with mild disabilities will be presented and a discussion for whether these expectations are similar/overlapping with those of the participants will be facilitated. Then, a presentation of teaching techniques and group work to generate ideas for activities will follow. The first day will conclude with a discussion of ideas, a reflection of what was learned and the completion of an end-of-day self-assessment tool.

The second day of the workshops will engage participants in activities that focus more on applying teaching methods and techniques of Inclusive STEAM education. This process will be initiated with a discussion of the first day's training and presentations for linking STEAM and inclusive education, as well as about inclusion techniques for children with mild disabilities. Group work on different case studies related to the implementation of STEAM activities will follow and the day will be concluded with a discussion of the advantages and disadvantages of the techniques presented, as well as a reflection of what was learned, processed, and appreciated.

The third and final day of the Bulgarian mobility program focuses on methods for realizing STEAM with children with mild disabilities, issues relevant to the

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management of STEAM activities and projects, good practices, and the creation of teaching and learning materials. Specifically, the training will begin with a discussion and a presentation of different methods, with a focus on presenting Bulgarian best practices. Next, the participants will collaborate to develop teaching and learning materials in the form of lesson designs, activity sequence progressions, etc. The day will conclude with a discussion and reflection and the provision of feedback for the overall mobility program.

Different methods will be applied for monitoring and assessing participants' learning and the level that the program meets their needs. For example, the group activities will incorporate peer or self-assessment criteria and reflection and wrapping-up activities at the end of each day will also be utilized for evaluation purposes, as well as the feedback provided by the participants that will be collected with an anonymous questionnaire.

7.2. Curriculum adaptations for implementing Inclusive STEAM Education

This program was designed by University of Macedonia, and it will be carried out in Thessaloniki, Greece. The overarching goals are for teachers to acquire knowledge relating to using UDL for STEAM in Special Education and instructional design, to develop Inclusive STEAM education activities/projects and learn more about relevant Greek best practices that can facilitate their own teaching practice. Below, teachers' needs that will be addressed in this program for each of the three days, as well as educators' competences that will be enhanced are presented in the Table 10.

Table 10: Teachers' needs and competences addressed for the UoM exchange program

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
Day 1	
To know the ways of adapting the general school curriculum to the needs of pupils	2.1.1. Design and adapt Inclusive STEAM Education curriculum of STEAM-related general and special education disciplines
Day 2	
To know the ways of adapting the general school curriculum to the needs of pupils	2.1.1. Design and adapt Inclusive STEAM Education curriculum of STEAM-related general and special education disciplines
Day 3	
To know the ways of adapting the general school curriculum to the needs of pupils	2.1.1. Design and adapt Inclusive STEAM Education curriculum of STEAM-related general and special education disciplines

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The goal of the first day of training is to merge STEAM- related disciplines' goals and Inclusive Education's goals to define Inclusive STEAM Education goals. To do so, educators will be engaged in self-reflection activities at the beginning of the training to reveal their experiences, ideas, prior knowledge etc., a presentation will follow along with group work and relevant assignments to formulate clear, observable, and measurable STEAM and inclusive education goals. The day will conclude with group reflection and discussion on this topic.

Following the same format as day 1, educators during the second and third day of training will adapt the transdisciplinary STEAM curriculum and goals into Inclusive STEAM curriculum and goals to address and meet all learners' needs with the use of frameworks such as UDL.

For monitoring and assessing participants' learning and the level that the program meets their needs, methods such as self-reflection and assignments will be utilized, as well as information deriving from performance tasks and the developed lesson plans.

7.3. Organization and Assessment Methodologies for Inclusive STEAM Education and Spanish Good Practices

This program was designed by University of Alicante, and it will be carried out in Spain. The overarching goals of this training program are for teachers to acquire knowledge relating to assessment and optimization of in school Inclusive STEAM education, to develop Inclusive STEAM education activities/projects and learn more about relevant Spanish best practices that can facilitate their own teaching practice. Below, teachers' needs that will be addressed in this program for each of the three days, as well as educators' competences that will be enhanced are presented in Table 11.

Table 11: Teachers' needs and competences addressed for the UA exchange program

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
Day 1	
To learn about methods of organizing integrated STEAM classes	3.1.2. Apply educational resources' management methods in Inclusive STEAM Education activities and projects
	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators

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Day 2	
To know methods of educational assessment of students with mild disabilities	1.5.1. Assess and analyze individual learners' activity/project performance in Inclusive STEAM classrooms
	1.5.4. Develop learners' STEAM portfolios
	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators
Day 3	
Learning procedures to determine the school progress of all pupils	1.5.1. Assess and analyze individual learners' activity/project performance in Inclusive STEAM classrooms
	2.2.2. Design, create and adapt appropriate resources and Instructions for Inclusive STEAM Education
	4.1.1. Participate and collaborate in local, national, and international educational communities, including schools and educators
	5.3.1. Select and use(self)reflective practices and tools for Inclusive STEAM Education

During the first day of training, teaching organization methodologies for Inclusive STEAM education will be applied. The day will begin with a self-diagnostic instrument for identifying participants' prior knowledge and experiences and it will continue with a presentation of methodologies that enable teachers to organize their class in an effective manner (e.g., collaborative learning, challenge-based learning, project-based learning). Group work and role play will follow to put into practice these methodologies in a simulated environment. The first day will conclude by filling in a self-reflection tool to compare prior knowledge to newly acquired information and practices, as well as the provision of feedback about the session by the participants.

The second day focuses on the development of understanding and skills relevant to assessment and especially on the development of learners' STEAM portfolios. Initially, teachers will complete a self-diagnostic tool to express their knowledge with regard to assessment tools and instruments. Then, different assessment methodologies and instruments that could be utilized in Inclusive STEAM education (e.g., portfolio, apps to monitor students' progress, tools for providing immediate feedback) will be presented and discussed. Group work and role play to put into practice the development of learners' STEAM portfolios will follow. For concluding the training, teachers

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will be asked to self-reflect on what was learned and provide feedback about the session.

The third day will focus more on the design and application of assessment and monitoring tools. Specifically, teachers will complete a self-diagnostic tool to identify prior knowledge and experiences in applying assessment procedures followed by an introduction on how to develop a portfolio, evaluation rubrics and checklists, as well as ways to integrate them in the learning process. General guidelines on the use of web applications to assess student progress (e.g., Quizzizz, Class Dojo, Kahoot, Mentimeter, etc.) will also be presented. Then, a case-based scenario will be provided to participants and through group work they will develop and/or select appropriate applications and instruments to evaluate students. All groups will present and discuss their ideas and the training will end with self-reflection and provision of feedback for the overall training.

For monitoring and assessing participants' learning and the level that the program meets their needs, methods such as self and peer reflection will be utilized, as well as information deriving from task performance and the educational material developed by the participants will be collected.

7.4. Inclusive STEAM Education in General Classroom Learning Activities and Cypriot Good Practices

This program was designed by University of Cyprus and will be carried out in Cyprus. The overarching goals of this training program are for teachers to acquire knowledge relating to curriculum design and evaluation with respect to inquiry-based learning, STEAM and Special Education, to develop Inclusive STEAM education activities/projects and learn more about relevant Cypriot best practices that can facilitate their own teaching practice. Below, teachers' needs that will be addressed in this program for each of the three days, as well as educators' competences that will be enhanced are presented in Table 12.

Table 12: Teachers' needs and competences addressed for the UCY exchange program

Needs expressed by teachers (as derived from D2.1. Gap Analysis)	Competences (as derived from D2.2 STEAM Educator Competence Framework)
Day 1	
Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities	5.1.3. Develop and apply learning to learn transferable skills
	5.3.1. Select and use(self)reflective practices and tools for Inclusive STEAM Education
	4.1.1. Participate and collaborate in local, national, and international

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	educational communities, including schools and educators
Day 2	
Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities	2.2.2. Design, create and adapt appropriate resources and Instructions for Inclusive STEAM Education
	5.3.1. Select and use(self)reflective practices and tools for Inclusive STEAM Education
Day 3	
Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities	2.3.1. Facilitate all learners' STEAM competences
	5.3.1. Select and use(self)reflective practices and tools for Inclusive STEAM Education

During the first day of training, teachers as learners participate in simulated Inclusive STEAM hands-on activities and then, as thinkers, reflect on their experiences and identify the rationale/ learning objective(s) behind the activity sequence they engaged with as learners.

During the second day, teachers as designers of Inclusive STEAM education utilize the experiences of Day 1 for modifying science-oriented curriculum to address learners' needs in group work. Groups then present their curriculum design proposals and receive feedback from peers. Finally, participants will reflect on acquired feedback to improve their designs.

The third day of training will start with a presentation on Inclusive STEAM competences and a Differentiation tool. Next, teachers will revise their curriculum designs to integrate goals relevant to the development of all learners' skills and finally, they will reflect on acquired feedback and overall experiences.

For monitoring and assessing participants' learning and the level that the program meets their needs, methods such as self-reflection and assignments will be utilized, as well as information deriving from performance tasks and the developed curriculum designs will also be applied.

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8. Future steps

The first priority of D3.1 was to design and develop a Joint STEAM Curriculum for Special Education. The work undertaken in the context of D3.1 contributed towards this direction, and thus the proposed designed curriculum will be used as the pilar for addressing the second priority of WP3, that is the development of a STEAM Training Programme for Special Education. In doing so, we will proceed with transforming the curriculum designed in D3.1 into a training programme tailored to national requirements, specify the didactical approaches that will be followed for the delivery of each phase of the training, define learning objectives and learning outcomes based on the selected competences that have been encapsulated in training modules of each training programme, and compile all these in an application guide to facilitate its implementation. The data that will be collected from all partners with regard to curriculum conformance with their institutional and/or national policies and frameworks will also be taken into consideration when designing the training program.

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Annexes

Annex 1: The template provided to university partners for developing their mobility exchange program

Title of the mobility training course:		
Participants: 48 teachers (12 per country) that also participated in the previous phases of the training program Duration: 3 days (plus two travelling days)		
Needs expressed by teachers (as derived from D2.1. Gap Analysis)	**Competences (as derived from D2.2 Competence Framework from STEAM) – learning objectives**	**Format of the course**
Add here the need(s) that you will address during each day of the program (see some suggestions below)	*Add here the competence(s) relevant to teachers' needs to be developed during each day of the program*	Day 1: *Briefly describe the format of your course (educational approach, activities, and assessment/monitoring methods)*
		Day 2:
		Day 3:

Suggestions for UCY's training program:

NEED: To know practical solutions for the educational inclusion of students with mild disabilities.
NEED: Acquire competences to know how to use STEAM education as a context for including students with mild disabilities in general classroom learning activities

2.2.2. Design, create and adapt appropriate resources and Instructions for Inclusive STEAM Education

- To modify and develop existing Inclusive STEAM content/ instructions in order to meet each learners' needs

Suggestion for the TUNI training program:

NEED: To learn about methods of organizing integrated STEAM classes

3.1.2. Apply educational resources' management methods in Inclusive STEAM Education activities and projects

- To organize and prepare the necessary materials and educational resources for Inclusive STEAM related activities/ projects.

Suggestion for the UoM training program:

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NEED: To know the ways of adapting the general school curriculum to the needs of pupils

2.1.1. Design and adapt Inclusive STEAM Education curriculum of STEAM-related general and special education disciplines

- To formulate clear, observable, and measurable STEAM –related disciplines goals
- To recognize design methods for creating transdisciplinary/ integrative curriculum (e.g. backward design, collaborative design etc.)
- To select and implement appropriate design method to create flexible transdisciplinary STEAM curriculum based on real life problems

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